

Stream Table Plans (metal tub)

Based on design by Mark Wagner

This stream table has an aluminum or stainless steel tub rather than the wooden tub used in the original Missouri Department of Conservation design. Other modifications from the Missouri model include wooden “saw horse” stands rather than automotive jacks, an optional battery or 12-volt transformer hook-up to provide power to the re-circulating pump, and a sink drain mounted in the tub.

The initial cost of the metal tub design is higher, but it is much more durable and requires less maintenance than the wood design. It also can be used to simulate an archeological dig (used with dry matrix), as a fish cleaning station during fishing workshops, as a shallow aquatic display, as a table for temporary displays of animal pelts or botanical specimens, or anywhere you need a large flat sink.

Approximate costs of some items:

plastic matrix	\$350 - \$450
metal tub	\$300 - \$400
pump motor	\$15+

Materials list:

- Aluminum or stainless steel tub; 80 by 32 inches; constructed from 4x8-foot sheet of aluminum or stainless steel
- 2, 10-foot pine 1-inch by 8-inch boards (or 1-inch by 10-inch with stainless steel)
- kitchen sink drain (save the drain stopper for other uses of the tub)
- plumber's putty or silicon caulk
- plastic tail pipe for sink drain, with screw connector to easily remove from drain bottom for transport (1-foot to 2-foot, can be cut to length)
- 4, 1/2-inch threaded rods, each 4-foot long
- 8 washers and 8, 1/2-inch nuts for threaded rods
- 4, 1/4-inch or 3/8-inch eye bolts, 8 nuts and washers for eye bolts (for tie downs)
- 8 angle braces with wood screws
- 18-20 metal, bonded to rubber, washers for tub support on wood frame
- 1, 3/4-inch ball type, street valve (brass)
- Plexiglas or aluminum plate for mounting street valve
- 2, plastic 90° elbows (one side threaded for street valve the other for 3/4-inch plastic tubing)
- 2, plastic 90° elbows (both ends for 3/4-inch plastic tubing)
- 14 feet of clear plastic tubing, 3/4-inch inside diameter (I.D.), 7 feet of the tubing should be very flexible and 7 feet of the tubing (to be mounted on tub) can be a more rigid 3/4-inch anhydrous ammonia tubing (found at a farm supply store)
- 2 hose clamps for 3/4-inch tubing
- 2 handles for carrying stream table, and wood screws for mounting
- 8 copper pipe straps and nails, for 3/4-inch pipe
- 13 gallon, or larger kitchen wastebasket or tub, 22 to 24 inches tall
- smaller wastebasket, tub, or bucket to fit inside larger one (above)
- submersible pump (360 gallons per hour)
- electrical transformer, input: 110 volt A.C., output: 12-volts D.C., 300 m A (same voltage output as a 12-volt car battery)
- optional 12-volt automotive battery
- connecting jack or alligator clips to connect automotive battery or transformer to submersible pump cord (9-volt battery connectors can be bought from electronics suppliers)
- plastic pitcher

- fine mesh for lining pitcher
- 4, 8-foot long 2-inch by 4-inch pine boards (saw horse bases)
- 4-inch decking or sheet rock screws, enough for saw horse and tub frame construction
- 10, 5-gallon buckets to carry matrix and other supplies
- 2 plastic grain scoops for moving matrix
- PVC reducing collar (4-inch to 3-inch) that will fit tightly inside the top of the sink drain; purchase at a farm supply store (used on perforated, PVC drainage tile)

Steps for construction of metal stream table (see diagrams also):

1. Contract the construction of the 32-inch by 80-inch aluminum or stainless steel tub. Aluminum should be at least .040 gauge; stainless steel can be thinner. Stitch weld four aluminum angle stiffeners to the tub bottom. Weld all corners and seams to be watertight. Double roll top edges to eliminate any exposed sharp edges or cover with edging for steel doors.
2. Construct a 1-inch by 8-inch (or 1-inch by 10-inch) pine board frame for the tub, using both decking screws and metal angles to support corners. A 10-foot board can be cut to form one side and one end piece.
3. Place the aluminum tub in the wooden frame so the bottom of the angle stiffeners are flush with the bottom of the wood frame. Drill holes in wood frame so a 1/2-inch threaded rod can pass through each side of the wooden frame and the space in the stiffeners. Place washers and nuts on each end of the threaded rod. Use glue or *Loctite* to make sure the nuts will not loosen.
4. Mount two eye bolts on the bottom of each side of the stream table for tie downs when transporting the stream table on top of a vehicle. Saw horse bases can be placed in the stream table, and all tied down with ropes. Remove the PVC tail pipe drain prior to transporting.
5. Drill nine or ten holes (from the inside) near the top of the aluminum tub (just below the top of the wood frame) on each side. Fasten the metal and rubber bonded washers with brass screws through the aluminum tub into the wood frame to support the sides. An aluminum tub will tend to buckle inward when the weight of the matrix and water are added to the tub. (Leakage should not be a problem since the fasteners are above the water line of the stream table.)
6. Position the 3-inch sink drain so it will be close to, but not over, the aluminum stiffener on one end of the tub. With a metal hole cutter or shears, cut the correct size hole for mounting it in the bottom of the tub, as close to one end as possible. Before you set the drain in place, use plumber's putty or silicon caulk to seal between the drain flange and the tub. Save the drain stopper for other uses of the tub, it will not be used for the stream table.
7. (Option) Mount two carrying handles, one on each end of the stream table. Position handles toward one corner of each end so that when the table is carried sideways the center of gravity will be below the line of the handle.
8. Attach two of the PVC 90° elbows into each end of a 7-foot length of plastic tubing (either flexible tubing, or the more rigid anhydrous ammonia tubing). Use hose clamps at each joint to make sure they will not separate. Attach tubing to the side of the stream table using seven 3/4-inch copper pipe straps.
9. Cut a piece of aluminum (old sign material) or Plexiglas (approximately 4-inch by 9-inch). File and sand all edges so there are no sharp edges. Bore a hole toward the center of one end, just large enough for one of the threaded 90° PVC elbows to fit through it. Screw the 3/4-inch ball valve onto the threads protruding through the hole in the plate. Make sure it is snug enough it won't twist in the hole. You may need to add spacer washers to get it tight. Screw the second threaded 90° PVC elbow into the open end of the ball valve and position the opening so it points downward, or toward the long end of the plate. During operation, slide this plate between the side of the metal tub and the

wood frame on one end. This “faucet” can be positioned anywhere on the upper end of the stream table. Use flexible 3/4-inch plastic tubing between this valve and the elbow on one end of the stream table.

10. Construct two saw horses from 2-inch by 4-inch lumber using some of the decking screws to assemble them. One should be 28 inches tall and the other should be 31 inches high. The board forming the top of the horse should be shorter than the inside width of the aluminum tub (30-31 inches long). Cut a groove in the top of this board lengthwise so the angle stiffeners underneath the stream table sit in it. (Saw horses can be placed inside the stream table during transport.)
11. Cut the plastic (PVC) 4-inch to 3-inch reducing collar to the desired depth of the “lake” at the lower end of the stream table. Cover the 4-inch end with fine screen or cloth mesh. Make sure the 3-inch end of the collar fits snugly inside the sink drain. This collar will control the water level on the lower end of the stream table and keep plastic matrix from washing down the drain.
12. Use a small plastic wastebasket, tub, or bucket to mount the submersible pump. It should be able to sit inside and on the bottom of a larger 13 to 15-gallon plastic tub or waste basket. The pump should be mounted just off the bottom (one to two inches). Bend an aluminum plate to form a mounting bracket with two flanges on either end of the plate. Bolt it in place through the sides of the smaller container. The pump can be mounted to this plate. Attach a two to three-foot length of flexible plastic tubing to the pump. Use the remaining copper pipe strap to attach the flexible tubing to the side of the smaller container, toward the top rim. Insert a PVC straight connecting couple into the open end of the flexible tubing. (This will hook to a length of flexible tubing from the stream table to the pump.)
13. Solder and electrical tape a 9-volt battery connector to the wire leading to the submersible pump. Make sure it is well above the high water level on the larger container. The 9-volt connector can be plugged into the 9-volt connector of the 12-volt transformer, if it is to be plugged in to a 110 volt wall outlet. Solder and tape longer wires and alligator or automotive battery clips onto the pump if you use a 12-volt automotive battery to power the pump.
14. Place the smaller container in the larger one during use. The pump will work best if the water level is kept high in the larger container.
15. Purchase a plastic pitcher with a handle. Cut the bottom part of the handle away from where it joins the pitcher so the pitcher handle will fit over the rim of the larger container (water reservoir) under the drain tail pipe. Drill several 1/2-inch to 1-inch holes in the bottom and sides of the pitcher toward the bottom. Line the pitcher with a fine meshed cloth bag. Double the mesh bag back over the top edge of the pitcher and hold it in place with a rubber band. This will catch any matrix that gets through the mesh on the stream table drain.

Suppliers

Submersible pump

Local garden supply centers

Aluminum tub

Local welder or metal worker who can weld aluminum or stainless steel

Plastic Matrix (composition material; Note: must order in large quantities)

Media Stripping Co.

749 NE Broadway Ave.

Des Moines, IA 50313

515/244-7263

plastic sediment

(need about 175 pounds)

need combination of fine (20/30), medium

(12/20) and coarse (8/12)

Stream Table Parts Inventory

_____	stream table tub
_____	2 saw horses for stream table
_____	plastic matrix in 5-gallon buckets or other large containers with lids
_____	2 reservoir basins with recirculating pump (tubs, trash cans, etc.)
_____	1 catch strainer with fine mesh cloth bag (pitcher)
_____	1 mesh drain stop
_____	1 water control valve and tubing
_____	1 drain tail pipe (+ spare)
_____	2 plastic matrix scoops
_____	1 tarp
_____	farm equipment
_____	cars/trucks
_____	farm animals
_____	fence segments
_____	buildings (hoses, sheds, stores, etc.)
_____	artificial trees
_____	artificial bushes
_____	boulders (rocks)
_____	1 bucket of Red Cedar twigs
_____	user manual (copied from MO Department of Conservation)